DOCUMENT RESUME

ED 071 616 HE 003 754

AUTHOR	Centra, John A.
TITLE	Strategies for Improving College Teaching. Report 8.
INSTITUTION	ERIC Clearinghouse on Higher Education, Washington, D.C.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C.
PUB DATE	Dec 72
NOTE	53p.
AVAILABLE FROM	Publications Department, American Association for Higher Education, One Dupont Circle, Suite 780, Washington, D.C. 20036 ($2.00)
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*College Instruction; *Educational Improvement; *Higher Education; *Teacher Improvement; *Teaching Methods

ABSTRACT

This report considers a number of ways to improve or reform college instruction. The methods discussed vary from those that would attempt to change what the teacher does to those that would change primarily what the student does. Which particular way one chooses to improve instruction undoubtedly depends on one's underlying philosophy of education. At one extreme, there are those who believe that the teacher's role is to help pass on a body of knowledge to students. While students are expected to put forth effort, a good deal of the responsibility for what students learn rests generally with the teacher, and improving teaching often means finding ways to improve such things as the organization of the course and the teacher's classroom performance. At the other extreme, there are those who believe that the responsibility for learning rests with the student, and that the teacher functions as a manager, a facilitator of learning who directs and motivates students when necessary. Improvement in this latter instance means helping the teacher to both develop and implement whatever techniques will cause students to learn more. In sum, the strategies for improving college teaching presented in this report, like the various roles for the teacher, cover a wide spectrum. (Author/HS)

Strategies for Improving College Teaching

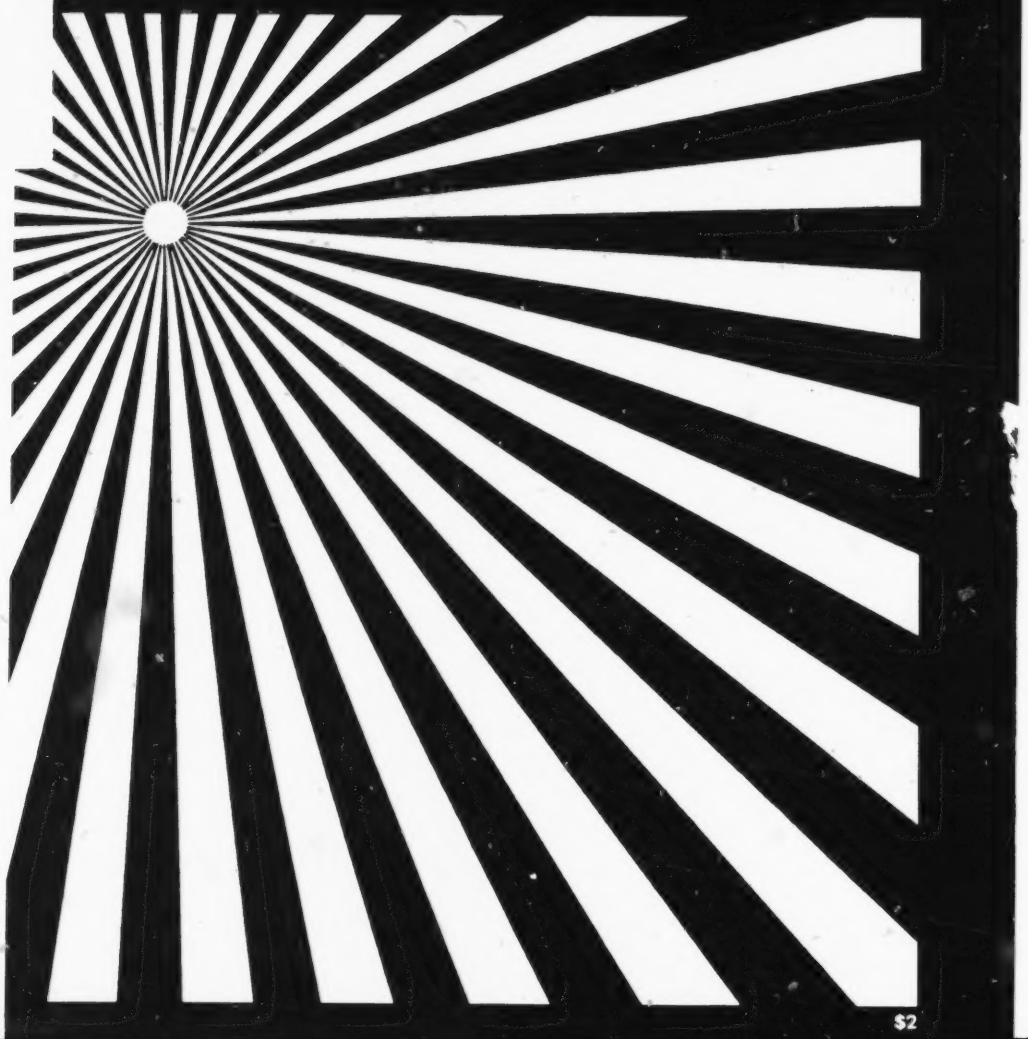
John A. Centra

Prepared by
the ERIC Clearinghouse
on Higher Education

Published by
the American Association
for Higher Education

8

1972



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Strategies for Improving College Teaching

John A. Centra

Prepared by the
ERIC Clearinghouse
on Higher Education
The George Washington University
1 Dupont Circle, Suite 630
Washington, D.C. 20036

Published by the
American Association
for Higher Education
1 Dupont Circle, Suite 780
Washington, D.C. 20036

December 1972

HE 003 754

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Foreword

This report by John A. Centra, a Research Psychologist at the Educational Testing Service, considers ways in which college teaching can be improved. A teaching–learning model is developed and its components provide the framework for discussing methods of instructional evaluation. These methods include faculty self-analysis, colleague observation, and the use of audio/video equipment. A survey of research on teacher characteristics, instructional practices and learning experience, and on the interaction of student and teacher is provided.

This is the eighth in a new series of Clearinghouse reports to be published by the American Association for Higher Education (AAHE). In addition to the report series, the Clearinghouse also prepares brief reviews on topical problems in higher education that are distributed by AAHE as Research Currents.

Carl J. Lange, Director
ERIC Clearinghouse on Higher Education
December 1972

1 Introduction

There is dissatisfaction with much of the instruction now going on in American colleges and universities. Criticisms of teachers and teaching have come from legislators, students, college administrators, and even from some faculty members. A recent Carnegie Commission on Higher Education Report, for example, stated that a third of the undergraduates and 46 percent of the graduate students surveyed identified the lack of quality in classroom instruction as one of their major concerns (*Reform on Campus: Changing Students, Changing Academic Programs,* June 1972).

A frequently offered remedy is to make effective teaching the basis for faculty promotions. There are those who believe that teaching will be improved only if it is somehow evaluated and used as a criterion for appointments or promotions. This may be true, but there is also the view expressed by a 1965 ad hoc committee on policies and procedures at Yale that evaluation to help improve teaching should be sharply distinguished from evaluation to assist in decisions on promotion. One of the major reasons usually cited for this view is that evaluation for the sake of promotion usually entails nothing more than a single, overall rating. But if course or instructional improvement is the goal, something more than a single good-bad judgment is needed—something that will give a teacher the kind of specific information needed for improvement. This report discusses ways in which college teaching is being and can be improved.

One further point needs to be made: to discuss the improvement of teaching is to discuss also the improvement of learning. They are, as has been frequently pointed out, simply two sides of

the same coin. Thus while this report often refers to teaching alone, a more accurate description would be teaching-learning.

Overview

In Chapter 2, the elements that the writer believes are part of teaching and learning in a college course are diagrammed and discussed. It is hoped that the model provides a useful overview of the teaching-learning process as well as a useful framework within which to discuss the implications of selected research findings for college teaching presented in Chapter 3. In Chapter 4, self-analysis as a mode to improve teaching is presented, and Chapter 5 deals with the question: To what extent can student rating lead to instructional improvement? What institutions are doing and can do to improve teaching is discussed in Chapter 6, a discussion that includes faculty development programs, the preparation of college teachers, and suggestions for workshops. Finally, the approach that some people believe will have the greatest impact on instruction—the new technology—is discussed in Chapter 7, followed by some concluding remarks in Chapter 8.

2 A Teaching and Learning Model

Before embarking on a discussion of the specific ways to improve college teaching, consideration might first be given to the various elements involved in teaching and learning in a college course. The author's view of what those elements are and how they relate to each other is presented in Figure 1. The general model can serve two purposes: First, it should provide a better understanding of the factors that influence and shape a college course, and second, the model is helpful in categorizing and discussing some of the various theories and research findings on teaching-learning, as will be demonstrated in Chapter 3.

Probably the most critical element in the model is represented by box E, the instructional practices and learning experiences involved in a course. Included in this area would be the methods of teaching the course, the assignments, the teacher's behavior, student-teacher interaction, the student "mix," and the general learning environment in the classroom. All of these experiences can vary considerably; for example, in obvious ways such as whether the course is a lecture or discussion, or in more subtle ways such as whether students stimulate each other's learning or whether they feel threatened by the instructor.

There are three primary "inputs" or elements that help determine what happens in a course: teacher characteristics (B), the course and instructional objectives (C), and student characteristics (D). Teacher characteristics include the teachers' attitudes, personality, knowledge of subject matter, and philosophy of education (conscious or otherwise). The course-instructional objectives, as can be noted in Figure 1, may be influenced by three sources. First, there is the individual teacher, who generally has

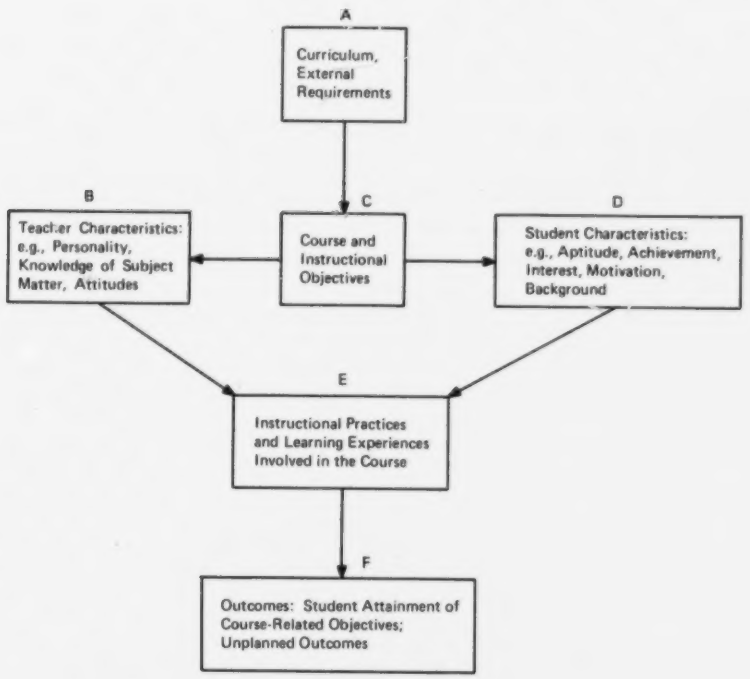

Figure 1. A General Model of Teaching and Learning in a Course

the greatest influence in determining what the objectives are to be. The second source, the requirements for the course imposed by the college or professional field curriculum (note the arrow from A to C), also can be quite important, and, in instances when the college or department has specified what is to be covered in the course, the individual teacher is restricted in determining his own course goals. The third potential source of influence on objectives is the students. Student influences on course objectives can be formally acknowledged (as when instructor and students cooperatively establish objectives) or they can be more or less ignored. In either case, students bring their own intentions, interests, aptitudes, achievement, and the like to a course and in so doing also impose their own set of objectives and priorities. In addition, student characteristics also influence their learning experiences (thus the arrow from D to E) and, indirectly, the outcomes of the course.

The outcomes of a course (box F) include both student attainment of course-related objectives and unplanned outcomes. The latter may or may not be beneficial (for example, the student who decides to major in an area as the result of a particular course versus the one who vows never to open another book on the subject). Moreover, outcomes need not be determined only at the completion of a course; instructors may obtain intermediate feedback to find out how well they are accomplishing course objectives.

There is a school of thought that advocates closer attention to some of the elements in the general model. Improved learning, they argue, would result if (1) objectives of the course (sometimes called performance or behavioral objectives) are specified and shared with students, (2) learning procedures are designed as much as possible to meet those objectives, and (3) the outcomes of the course are evaluated in terms of the objectives (evaluations would actually take place at several points during the course to assess student progress and, if necessary, to adjust the learning procedures).

3 Research Implications for Teaching and Learning

The general model presented in Chapter 2 (Figure 1) can be particularly useful in gaining an overview of the various theories and research dealing with teaching-learning. The research findings discussed in this chapter, therefore, are related to the different segments of the model: teacher characteristics, instructional practices and learning experiences (for example, teaching methods), and finally studies that have used an interaction paradigm that involves several segments of the diagram. While the following is not by any means an exhaustive review of the literature, it is hoped that it will provide a capsule of relevant findings and some possible implications for the improvement of teaching.

Teacher Characteristics

Some researchers have attempted to identify the personal characteristics of teachers who are effective, that is, whose students learn the most. Personality or attitudinal questionnaires, personal background information, and tests of the teacher's subject knowledge are employed, and effective teachers are defined as those who possess characteristics that appear to be related to student achievement. However, it appears students do not always learn more from teachers with identifiable and measurable characteristics. Brawer (1968) reviewed studies of the personality characteristics of college and university faculty and found that the studies were "few and inconclusive." A study of junior college teaching interns at UCLA, in which a series of demographic and psychological variables had been employed, concluded

that "successful" teachers would possess highly diverse characteristics (Cohen and Brawer, 1969); thus, research findings to date have not been especially fruitful.

It is doubtful, in any event, that significant improvement in teaching would be produced even if characteristics of "effective teachers" could be identified. Presumably information derived from this approach might be used to select teachers as well as to change those now in the profession. Using the information for selection purposes, however, assumes greater confidence in the measures employed than they probably deserve. For example, how reliable will they be for *prospective* teachers? And attempting to change personality or similar characteristics among existing teachers seems equally tenuous. In most instances, the individual characteristics would be difficult or impossible to change even if convincing evidence for their importance could be accumulated. Moreover, the question arises as to whether all teachers should indeed fit one mold. Is there not virtue in exposing students to a number of personality and teaching styles?

That there are a number of different styles of teaching seems beyond question and the results of several studies bear this out. In his research at the University of California, Axelrod (1970) identified five classroom styles of college teachers in the humanities. These were: the drillmaster, the content-centered faculty member, the instructor-centered faculty member, the intellect-centered faculty member, and the person-centered faculty member. The first two are subject-matter-centered instructors—covering the materials of their discipline systematically is their major task; the drillmaster relies on recitation rather than discovery or discussion. The last two are student-centered, the difference between them being that the person-centered instructor believes in integrating the nonacademic and academic progress of students rather than keeping them separate. Finally, in the middle is the instructor-centered teacher, who is also the most common type according to Axelrod. This teacher plays the role of a model in the classroom, demonstrating for students the ways of understanding and formulating in works of his discipline.

Jarrett (1972) discussed three styles of lecturers—the hams, the organizers, and the thinkers—each of whom he feels has virtues. Jarrett, Axelrod, and many others are also quick to point out that within each of the various styles there are excellent teachers as well as poor teachers; that there is, in other words, no one correct style; and that teachers should learn to develop their own distinctive style based on their individual strengths.

Instructional Practices and Learning Experiences

A great deal, if not most, of the research on teaching has focused on the all important area of instructional practices and learning experiences. Included are studies that attempt to identify what good teachers do, studies of the dynamics in the classroom, and studies that compare the effectiveness of various teaching methods.

1. *Identifying effective teaching.* It has been said that good teaching is identifiable to those who experience it. In this regard a number of investigators have used what might be called the consensus approach to identify effective teaching. Typically the approach has been to ask a large sample of students (Musella and Rusch, 1968; Quick and Wolfe, 1965), or students and faculty (Hildebrand, Wilson, and Dienst, 1971), or students, faculty, and alumni (Perry, 1967) to give their opinions of effective or ineffective teacher behavior. Frequently the groups respond to a checklist of teacher characteristics or behaviors. Those behaviors or qualities that the largest number of people identify are assumed to approximate effective teaching and, consequently, have often been used in developing rating scales to evaluate teachers or to help improve instruction. In general, different studies have identified many of the same behaviors or qualities. For example, the ability to convey interest and enthusiasm to students has been judged a quality of effective teachers by several of the samples. The Perry study, moreover, reveals remarkable agreement between students, faculty, and alumni groups in their ranking of behaviors.

As a way of giving a rational basis for choosing which behaviors to improve, the consensus approach does have merit. One drawback, however, is that the qualities identified are frequently so broad and "godlike" that how to go about changing one's teaching is not always readily apparent. (An experimental study that investigated one effort to change more specific instructional procedures is presented in Chapter 5.)

2. *Classroom dynamics.* A point of view increasingly heard is that a better understanding of what actually happens in the college classroom is needed. At the elementary school level the observation techniques reviewed by Medley and Mitzel (1963) have produced a wealth of information on student-teacher interactions in the classroom. Nothing like this has been done with college teachers although there have been at least two intensive studies of the college classroom that have implications for improving teaching.

The first study, by Parlett (1969) at the Massachusetts Institute of Technology, used three techniques: participant observation, interviews and informal discussions, and questionnaires. These techniques allowed an in-depth study of three physics courses at MIT, with Parlett concluding that:

> Certain of the implications and overall conclusions extend beyond MIT. For example, the research provides little support for the view—still implicitly held—that there is a set of specifiable conditions for effective classroom learning. It was clear that instruction was multidimensional, with different types of teachers fitting the needs and wishes of different students; and that learning was a markedly individualistic matter, strongly influenced by the student's interests, self-confidence, and willingness to 'selectively neglect.' (p. 1104)

Parlett thus found that the "fit" between teacher and student was crucial and that student characteristics were an important part of the teaching-learning equation.

Understanding the development of student-teacher relations and the emotional events of the classroom over a term were also the purposes of a study by Mann (1970) and his associates at the University of Michigan. In contrast to Parlett's findings, however, Mann et al. point out that a student may change during the term and that these changes may be due to a resolution of his relationship with the teacher. Thus a student with little motivation at the beginning of the term may eventually become highly motivated.

3. *The effectiveness of different teaching methods.* In contrast to the in-depth studies discussed above, there have been many studies that simply look at the relative effectiveness of the various classroom teaching methods. Dubin and Taveggia (1968) reanalyzed the data from almost 100 experimental studies completed over the past 40 years and concluded that teaching method didn't make much difference in student learning of subject content.

Among the comparisons made were:

- Lecture versus discussion
- Lecture versus lecture and discussion
- Discussion versus lecture and discussion
- Supervised independent study versus lecture
- Unsupervised independent study versus supervised independent study.

The methods represented a continuum ranging from those that emphasized *teaching* (lecture, lecture and discussion) to those that emphasized *learning* (unsupervised independent study). Using student performance on a course examination as the criterion, Dubin and Taveggia found that although there were occasional differences between methods, these could have occurred by chance and that "no particular method of teaching is measurably to be preferred over another."

On the basis of these findings, one could conclude that it really doesn't make much difference what the teacher does (learning goes on regardless); skeptics might add that teacher improvement is itself a doubtful goal. But before allowing these conclusions, two points should be considered. First, the major criterion used in the studies reviewed was student performance on a final examination. For the most part these final examinations assessed student knowledge of subject matter and nothing more. McKeachie's (1970) comparisons of teaching methods indicate that small classes and discussion classes (versus lectures) *are* more effective for the goals of retention, application, problem solving, attitude change, and motivation for further learning. Second, it is likely that different teaching methods work most effectively for different types of students. This leads us to the importance of the interaction among student characteristics, instructional objectives, and instructional practices.

Interaction Research

Referring again to the general model diagrammed in Chapter 2, the so-called interaction studies involve boxes C, D, E, and F (the interaction of student characteristics, instructional procedures, instructional objectives, and learning outcomes). The interactionists state there is no one general theory of instruction but several theories that may be valid for certain students learning certain things in certain situations. In particular, they would argue that the differences in learner characteristics—aptitudes, traits, interests, and other characteristics—necessitate different teaching approaches if maximum learning is to take place.

Despite the appeal of the interaction approach, the research results have not always been supportive (see a recent review by Berliner and Cohen, 1972). For example Goldberg (1969) did not

find significant interaction between student personality characteristics (some 350 test scores) and course format (structured versus unstructured courses). McKeachie, who has long emphasized the importance of interaction in studies of college learning, has presented an excellent review of these studies in the 1970 ERIC report titled *Research on College Teaching*. He rationalizes the more pessimistic findings with the admonition that "teaching and learning is an enormously complex business in which so many variables are involved that interaction effects, like methods effects, pop up only a little way above the apparent noise generated by other variables."

Yet even if interaction effects were consistently positive, the question arises as to whether providing the best fit between teacher and student, or student and method, is always in the interest of the student. Are there not types of teachers to whom students should be exposed even though the match may not result in maximum academic achievement? Should authoritarian students, for example, be exposed only to structured courses and authoritarian teachers? The answer should be obvious, especially if the goals of a particular college include opening the student to a variety of intellectual experiences. But what about variations in learner characteristics? There is little doubt that teachers should know more about the needs and motivations of students in their classes. That theme, in fact, has surfaced in many of the studies reported throughout this chapter. There are also those who believe that most teachers need to spend more time thinking about and specifying what they are trying to accomplish in their courses.

4 Self-Analysis and Teaching Improvement

This chapter considers efforts made by individual faculty members to identify weaknesses in their teaching and some selected methods to sharpen or focus self-analysis, including audio/video feedback and the use of faculty colleagues or an outside team of experts.

How "Realistic" Is Self-Analysis?

Kenneth Boulding (1970) proposed a list of "queries" to be used by teachers for self-examination. The queries, in the spirit in which the Quakers used the technique, are meant to inspire "ethical self-analysis;" they are not, however, dogma to be followed unquestioningly. Included in Boulding's list are:

- Do I abuse my position of superior status to the student by treating him as a moral or social inferior? (Boulding adds that we need to know more about the effects of bullying and sarcasm as blocks to learning as well as the effects of heavy emphasis on equality of status between the teacher and the student.)

- Am I careful to avoid using my authority to force factual acceptance of propositions which may be only opinion or hypothesis? Do I tolerate honest disagreement?

- Do I express my covert or overt hostility to my students in my teaching? Am I irritated by student failure, or am I quick to detect and encourage growth in knowledge and understanding, however slow or imperfect?

- Am I myself interested in the subject matter that I am teaching? Do I enjoy learning more about it, and do I carry over to the student my own enthusiasm for the subject?

- Do I convey to my students both the setting and the significance of my subject matter, so that it is neither isolated nor irrelevant? (p. 119-121)

Being authoritarian, hostile, closed-minded, unenthusiastic, or irrelevant are some of the sins Boulding thinks teachers should look for in examining their consciences. This we can readily accept but the question remains: Can teachers really be expected to see themselves *realistically*? The results of a study recently completed by the writer demonstrate a clear discrepancy between the way most teachers described their instruction and the way students described it (Centra, 1972c).[1] Not surprisingly, most teachers in that study viewed themselves in more favorable terms, particularly on such matters as whether they stimulated student interest, the extent to which the course objectives were met, and whether the instructor seemed open to other viewpoints. Of course there were some teachers who viewed themselves very much as their students viewed them, and even a few who had more negative perceptions. Nevertheless the majority saw themselves in rather glowing terms—this in spite of the well-known tendency for students' ratings of teaching to be rather lenient and skewed in a positive direction (Remmers, 1963).

The self-ratings study, which included over 300 teachers from five colleges, provided further evidence that teachers often view themselves differently from the way their students do. The instructors' self-descriptions of each of 17 items were correlated with the mean responses of students in their classes on each item (N=343). The median correlation was .21, indicating only a modest relationship between the two sets of evaluations. Not surprisingly, the highest correlations occurred for the more factual items, on which there was less subjective judgment involved (for example, the instructor informs students of how they would be evaluated), while items eliciting more subjective information (for example, the instructor is using class time well) resulted in the lowest correlations.

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[1] Items from a student evaluation-of-teaching form were reworded slightly for instructor responses. Instructors were asked, for example, whether they thought they had made objectives clear, whether they were encouraging students to think for themselves, and so on.

Previously, studies at the college level that investigated faculty self-ratings employed a single, overall measure of teaching (instead of many specific items relating to instructional practices), and they too produced similar findings. In fact, not only were faculty and student ratings of "overall teacher effectiveness" only modestly correlated, but so were faculty-administrator and faculty-colleague ratings (Clark and Blackburn, 1971; Choy, 1969). In other words, there seems to be ample evidence that most teachers do *not* view their teaching as their students, their colleagues or administrators at their college view it. On the other hand, these same researchers report fairly substantial agreement among colleagues, students, and administrators in their ratings of teachers, so it might justifiably be concluded that teacher self-ratings miss the mark by a good deal. Self-analysis alone would seem to have little promise for improving instruction.

But can self-analysis be supplemented or sharpened in some way so that it leads to instructional improvement? Undoubtedly yes. Using ratings from students, as the findings discussed in Chapter 5 suggest, is one such way; another is through observations of one's teaching by one's colleagues; a third is through audio or videotape replays; and a fourth is what Nevitt Sanford (1970) has proposed: bringing in an outside team to aid in faculty self-study.

The Use of an Outside Team

Sanford believes that teachers can be made more aware of themselves and what they do by an outside team proceeding in three ways:

- Conducting intensive and comprehensive interviews with faculty members
- Using the analysis of what comes out of these interviews to lead discussions among groups of teachers
- Observing teachers in their classrooms and then analyzing the results jointly with them (Sanford, 1970).

Sanford and his associates applied this approach with 120 teachers at four institutions and concluded that teaching could be improved at other institutions if they adopted these procedures. In

Sanford's view three necessary and interrelated goals were achieved, the first of which is most basic:

- Greater awareness on the part of professors of their philosophies, objectives, and styles of teaching
- Familiarity with alternative ways of attaining their objectives.
- Recognition of the legitimacy of being interested in students and deriving satisfaction from work with them (p. 3).

Although Sanford argues that bringing in an outside team capable of carrying out the procedures would be a more effective as well as a less expensive approach to improving teaching than present efforts to recruit good teachers or to reward superior teaching, there are probably very few teams now available who could accomplish the kind of results Sanford predicts. Moreover, for a number of institutions the cost would still be prohibitive.

Faculty Colleague Observation

A less expensive practice than bringing in an outside team is to develop a system of classroom observation by colleagues. Many institutions or departments now use this approach, with a few, such as Bard College in New York State, incorporating the resulting evaluations in decisions on promotion and tenure (Hodgkinson, 1972). At Bard, junior faculty members eligible for tenure or promotion are observed several times by several senior faculty members. After consulting the teacher before the class to find out class and course objectives as well as what the previous history of the course has been, the senior faculty member must stay for the full class period. Afterward, he confers with the instructor and submits a fairly extensive written summary of his observations to the department chairman and to the instructor. Junior members are also allowed to visit senior member's classes to observe their teaching techniques.

While there is little evidence on the effectiveness of colleague observations for the purpose of reaching decisions on promotion, it would certainly seem to have potential for instructional improvement. Both the observer and those observed could profit from the experience; in fact, the observations might go a step

further and form the basis for faculty discussions of effective and ineffective teaching. There is, moreover, no need to limit colleague critiques to classroom performance alone. Comments on assignments, reading lists, course objectives, examination questions, and the like could also be shared profitably. Some departments, in fact, schedule seminars in which members take turns presenting their objectives for a particular unit of subject matter and the ways in which they plan to present the material.

Audio/Video Feedback

Another way in which teachers can increase self-awareness of their teaching is through the use of video or audio replays of their classes. Most teachers have very selective memories about what transpires in class and a TV camera or tape recorder could capture a great deal of potentially helpful information. In all likelihood visual replays would be more useful, although recorders are probably more generally available. Some teachers may be able to view or listen to their teaching performance by themselves and see ways in which they could improve. But these may be a rare breed, or the faults that are recognized may be rather minor. In fact, one recent study of focused versus unfocused feedback suggests that simply viewing a replay without interruption or guidance is not totally effective. In that study (Rezler and Anderson, 1971), people who viewed videotapes of their interaction in group discussions did not change their self-perceptions unless the replay was focused—that is, the videotape was stopped at selected places and the viewer's attention directed to specific cues or behavior.

Video or audio feedback, then, quite possibly would have a much greater impact on teachers if they become sensitized to what they are doing wrong, perhaps by a "teaching consultant" or master teacher on the faculty. Or, in the absence of such an individual, two or three teachers might react to tapes of each other's classes.

As will be discussed later in this report (Chapter 6), video feedback is also the basis for microteaching, a device used mainly in training prospective teachers.

5 Student Ratings and Teaching Improvement

There seems to be widespread faith that student ratings of teaching lead to improvement in teaching practices. The results of student ratings have been used fairly extensively over the past several decades and increasingly in recent years. Occasionally they have been used for tenure and promotion decisions but, more typically, have provided the teacher with feedback from students for course and instructional improvement. In the latter case the results are generally seen only by the instructor, and interpretation of the results as well as what to do about them is left entirely up to him or her. The assumption is that most teachers value student opinion enough to alter the course or their instructional practices when needed. But do they?

Students tend to be optimistic about the effects of their ratings: A substantial percentage of a sample of students at the University of Illinois thought that the ratings would change most teachers' future performance (Costin, Greenough, and Menges, 1971). Student ratings did lead to modest improvements in teaching at the high school level (Tuckman and Oliver, 1968; Bryan, 1963) and even at the sixth-grade level (Gage, Runkel, and Chatterjee, 1963). At the college level, however, Miller (1971) found less encouraging results. He reported that end-of-semester student ratings for teaching assistants who had received mid-semester feedback were similar to end-of-semester ratings for teaching assistants who did not receive the midsemester feedback. It should be noted, however, that these negative results were based on a small and limited sample (36 teaching assistants assigned to discussion sections in three courses) and must therefore be treated as tentative.

If it can be demonstrated that feedback from students modifies college teaching practices, then the method in use now, where results are seen only by the instructor would seem justified. If student ratings lead to no significant improvement, then other means of improving instruction should be employed.

The Effectiveness of Student Feedback—A Five-College Study

The author undertook a study during the 1971-72 academic year at five different types of colleges (for additional details see Centra, 1972b). College teachers were asked to administer a student rating form in one of their classes. The teachers were then randomly assigned to one of three groups.

1. *The feedback group.* Teachers in this group administered a student rating form at midsemester and received a summary of the results within a week, along with some comparison data to aid in interpretation. In research terms this is the "treatment" group, with the treatment in this instance being essentially what is done at most colleges that use student ratings for instructional improvement, the results being seen only by the instructor.
2. *The no-feedback group.* This group used the rating form at midsemester but did not receive a summary of results until the end of the semester. This is the so-called "control" group.
3. *The posttest group.* In this case the rating form was used only at the end of the semester to determine whether midsemester ratings had a sensitizing effect on teachers in the no-feedback group; that is, whether simply using the form caused teachers to change, even without getting feedback.

In addition to using the rating form at midsemester, the teachers in the feedback and no-feedback groups also administered the form at the end of the semester. Both midsemester and end-of-semester ratings were collected during the fall semester of 1971. A single semester, instead of two successive semesters, was used for the study to enable the same students to provide both sets of ratings. The rationale was that the students who rated their teachers at midsemester should be the beneficiaries of the teachers' improved procedures of instruction.

The rating form contained 23 items that asked for the students' judgments on certain instructional procedures or behavior of their teachers. It was presumed that these procedures were of the sort a teacher could change. Included were items that

faculty members in an earlier study had identified as providing information they would like to have from students (Centra, 1972a). Among the areas included were those dealing with the organization of the course, the clarity of objectives and presentations, and the instructor's helpfulness or availability to students. Several of the items may be found, with slight variations, in a number of current student rating instruments.

If student feedback improved instruction, the end-of-semester ratings of the feedback group should be better than either the no-feedback or the posttest group. They were not. In fact, the three groups were nearly identical in their scores for each of the items, an indication that the group of instructors who received student feedback did not noticeably modify their teaching practices in the half-semester. This was true for instructors in all disciplines, from both sexes, and with varying amounts of teaching experience.

Had the analysis stopped here the results would have suggested that student ratings were of little value in changing instruction. But additional analyses proved otherwise.

Teachers in the feedback and no-feedback groups were asked to respond at midsemester to slightly reworded items from the student form such as whether they thought they had made their objectives clear, and whether they were encouraging students to think for themselves. It was anticipated that student feedback would effect changes in teachers who rated themselves more favorably than had their students. The expectation was generally fulfilled; the greater the discrepancy—where the discrepancy reflected the extent to which students rated teachers less favorably than the teachers apparently expected—the greater the likelihood of change.

In other words, changes occurred after a half-semester only for those teachers who had unrealistically high opinions of their teaching practices.[1] Other teachers may have rated themselves average or poor, just as their own students rated them, but these teachers did not change even though there was room for improvement. It is possible, however, that some of these teachers may change with additional feedback and more time. To test this

[1] A theoretical explanation of this change may be found in equilibrium theory (for example, Heider, 1958). According to the theory, teachers who received unexpected and unfavorable student feedback changed in order to restore a condition of "equilibrium" in themselves.

possibility the study was continued during the spring semester. Instructors in the feedback group again used the student rating instrument. This time they scored better than a second control group of teachers on several items. Given enough time, then, student ratings did result in some modest instructional changes for a wide range of teachers.

What are the implications of the results of this study? First, while the changes were by no means overwhelming, they do support the utility of student ratings for instructional improvement. Although the reliability of student ratings has been demonstrated, their utility as well as their validity have been under constant fire.[2] Evidence of their validity is slowly being accumulated. Past research indicates that students learned more from instructors who, they said, gave clear explanations, were organized in their lessons, stimulated their intellectual curiosity, gave interesting presentations of course material, were attentive to students' reactions, were friendly, and were flexible (Cohen and Berger, 1971; McKeachie, 1969; Mann, 1969; and Solomon, Bezdek, and Rosenberg, 1963). Positive changes in several areas of teaching were noted in this study. Thus the usefulness of student ratings in affecting critical aspects of instruction was also in evidence.

Secondly, while some changes due to student feedback were found, they were certainly not of a magnitude and variety to encourage a teacher to rely solely on student ratings for instructional improvement. Student ratings are, to be sure, a limited way of improving teaching, and their impact will vary according to the "treatment" given the responses. In this study only the individual instructor saw the responses. But what if the evaluations were "open," published, or in some manner made available to interested individuals (department chairmen, deans, students)? Would their impact in changing instruction be any greater? Quite likely it would be, for not only would there be additional social pressure but, as Kenneth Eble (1971) comments, it is difficult to separate the information function from the evaluation function in the uses made of student ratings; once the responses are made public, they would probably be used by chairmen and deans for evaluating faculty members. As such, teachers would probably have more incentive to improve, but there is also the possibility that such

[2] For a recent review of research on student ratings see Costin, Greenough, and Menges (1971).

emphasis would reduce risk taking and creativity in the classroom. Eble argues, however, that a questionnaire that emphasizes innovation will not inhibit experimentation on the part of the instructor and that student evaluation can, in fact, stimulate creativity and new teaching skills in the classroom.

In order to reduce the threat of student ratings that are made open or public, Eble further suggests that:

> First, faculty members must be informed and involved in the adoption of an evaluation system. Second, they must be given continuing accurate and detailed information about the use of the results. Third, ways should be clearly established for individual faculty members to register objections, to particularize complaints, and to have assurance that instruments and procedures are responsive to criticism and suggestions. Fourth, opportunities need be freely given for private counseling about an individual's teaching. Similarly, forums for discussion are important not only to making the most of the interest which evaluations arouse but to establishing confidence in the system through the free exchange of actual experiences with it. (p. 36)

The suggestion that individual counseling be made available to teachers has special merit. Helping teachers interpret their student evaluations as well as suggesting particular ways in which they might improve would be critical functions of a "teacher counselor." Improvement aside, it may be that a teacher simply needs to be reassigned or counseled into better use of his special talents. A teacher who is inadequate in delivering lectures may be much more successful in conducting discussions or in preparing learning materials. Or it may be that the individual would be happier and better suited, say, to practice engineering than to teach courses in engineering. A system that allows this kind of flexibility is not only more humane but will be better for having capitalized on the strengths of individuals.

6 Institutional Programs for Teaching Improvement

Faculty development programs and the preparation of college teachers in graduate schools are two ways in which institutions can influence teaching. This chapter considers current and proposed programs in each of these two areas and outlines possible topics for workshops or seminars directed at improving teaching.

By necessity, the information in this chapter is generally limited to published material that came to the writer's attention. There may well be significant omissions.

Faculty Development Programs

> Except for support of research, institutions and the profession do little to develop college faculty members as teachers. Within institutions, the setting aside of a specific percentage of a budget for faculty development is a very uncommon practice. Within the profession at large, the forces which work against undergraduate teaching are probably as great as those which work for it (Eble, 1971, p. 2).

This was the conclusion of Kenneth Eble after two years of conferences and discussions held as part of the AAUP Project to Improve College Teaching. Further evidence for this conclusion came from the results of a "career development" questionnaire sent out by the Project. Faculty members at some 150 institutions stated almost unanimously that their institution did not have an *effective* faculty development system. A more comprehensive 1968 survey of 1,250 colleges (Many et al., 1969) indicated that

about half the institutions provided no inservice education whatsoever for their teaching staff. (Inservice education, or faculty development, is usually defined as an institution's purposeful and organized effort to promote the professional development and performance of its teaching staff.)

What needs to be done, according to Eble, would be the following:

1. Financial support. A specific apportionment of a percentage of a university's general operating fund to faculty development, and specific allotment within that apportionment for development of teachers and teaching.
2. Presence of a definite system. A system does not need to embrace all activities directed toward faculty development nor does it in itself assure effective results. But the creation of some regular, continuing program with identifiable characteristics seems essential.
3. Lodging of responsibility with a high administrative officer. A "president's program" might be ideal. The academic vice-presidency might do as well, with major responsibilities resting with a single administrative officer.
4. The program itself should include:
    - Attention to the needs of beginning teachers in the form of programs to develop teaching skills.
    - Grants and leaves designed to be available specifically to young teachers, those in mid-career, and older teachers. These might be on a competitive basis only within each category, and be specifically designed to best attract the attention of and minister to the needs of faculty members in each groups.
    - Departmental grants for programs which promise to improve instruction or add to the competence of faculty members as teachers.
    - Support of teachers not attached to departments and of non-collegiate structures for learning.

5. Coordination with a system of teaching evaluation and assessment of student achievements.

6. Purposeful study and attention to the reward system within departments and the university to see that teaching rewards square with institutional policies.

7. Providing of information about and assistance in taking advantage of exchange programs for teachers, new teaching assignments, innovations on campus and elsewhere, and the workings of the faculty development system itself (Eble, 1971, pp. 128-129).

A report prepared for the Oregon State Board of Higher Education advocated some similar commitments on the part of institutions. The report entitled *A Plan for the Improvement of Teaching in State System Institutions, 1969-1971* (Johnson, Forestal, and Layman, 1968) stressed the importance of an institutional ethos that says clearly to the professor that teaching is important. Among the clues to such an ethos are the following:

- What solid evidence is there of the president's concern that the institution be known for the quality of its teaching? What evidence that the president seeks in any systematic fashion to keep informed as to the state of teaching in the institution, or the efforts being made to encourage continuing interest in good teaching?

- Is there any evidence that the deans and department heads are seeking in any continuing, systematic fashion to stimulate the departments to a concern with the quality of teaching?

- Is there any kind of institution-wide agency having special responsibility for promoting the improvement of teaching in the institution?

- What kinds of special provisions are there to encourage individual faculty members interested in the improvement of their teaching? Funds, facilities (e.g., audio-visual centers, TV recording and playback equipment), time (provision for faculty to be allocated some time for special approved projects related to improvement of instruction).

- What efforts are made in a systematic fashion to consider teaching abilities and achievements in the making of decisions as to promotions, salaries, and tenure? (p. 104)

Thus both Eble and the authors of the Oregon report see the need for an institution to demonstrate its commitment to teaching by providing money, facilities, and high administrative support for a program for the development of effective teaching. Both studies also stress the need to recognize and reward good teaching.

According to Eble some of the specifics of a program of faculty development, which would vary from year to year, might include:

> . . .(1) discussions of teaching practices by gifted teachers from on and off-campus, (2) opportunities for new teachers to demonstrate or discuss teaching by outside teams, (3) reviews of departmental courses and teaching by an outside team, (4) rap sessions with students about the particulars of teaching and teachers, (5) development of specific innovative practices, new courses or inter-departmental alliances, use of students and teachers in different learning contexts and the like, in which the new faculty members would be significantly involved (p. 52).

Eble also suggests that institutions identify effective teachers who are willing to give advice and counsel to their colleagues, particularly to beginning teachers. These "counselors" could be made known to the faculty and would function on a strictly informal and confidential basis.

Having new faculty establish a personal, counseling relationship with one or more experienced members of the faculty was one of the elements of an internship program provided by the Fund for the Advancement of Education between 1953 and 1957 (Diekhoff, 1960). In addition, the interns were given a reduced schedule of teaching and were obliged to attend seminars dealing with the philosophy of higher education, problems of higher education, and problems and techniques of teaching. Although the program was judged generally worthwhile, it is difficult to point to many colleges that have implemented it. A further overview of faculty orientation and development programs at specific colleges has been presented by Gustad (1963).

Centers for teaching. On a more formal basis, Eble and the Oregon report recommended something that a number of large institutions have already implemented: centers for teaching and undergraduate learning. Cornell University's recently established Center for the Improvement of Undergraduate Education and Michigan State University's Educational Development Program are two examples of such centers. Among the objectives of the Michigan State program are:

- To identify major problems in the area of curriculum, the learning-teaching process and the utilization of faculty financial and physical resources.
- To undertake projects which give promise of improving both the quality and the efficiency of the undergraduate program.
- To support and provide service to groups interested in experimentation with new procedures and methods in learning and teaching (Dietrich & Johnson, 1967, p. 209).

There is, of course, no need for these institution-wide centers or services to have the breadth of responsibilities included in the Michigan State center. A number of institutions have in fact recently appointed small staffs, often only one person, to perform a single function, that of helping faculty improve their teaching. One such teaching consultant at a junior college describes his job simply as being a "friend of the faculty."

On a more theoretical level, Siegle (1968) sees an institution-wide office that would serve as part of a team that works with the instructor in designing "instructional settings." Viewing the teacher as strictly a manager for learning, Siegle would have this all-university office monitor each student's intellectual and emotional development. Together with the teacher, it would then set appropriate goals for the student and select the instructional aids—books, tapes, seminars, and so on—that would enable the learner to progress toward those goals. Most likely, this institution-wide office would also depend heavily on the new technology devices discussed in Chapter 7 of this report.

Faculty Development in Community Colleges

Because of the rapid increase in the number of community-junior colleges and the special needs of their students, faculty development in these institutions has been especially crucial. Moreover, justifiably or not, these colleges have also recently been singled out for criticism of their teaching. A 1972 report submitted to the President and Congress by the National Advisory Council on Education Professions Development stated that the pool of teachers available for work at community and junior colleges is "woefully inadequate" because current instructors "do not know how to teach," and teacher education programs are doing

little to help them learn. The Council recommended that the highest priority be given to new and effective inservice training programs because teachers are not in tune with the colleges' objectives of providing an education for the often "under-educated" students they enroll (*Education Daily,* May 31, 1972).

A number of models or procedures to improve faculty performance have already been implemented at various community colleges. Several of the schemes have emphasized student achievement of defined instructional objectives as the appropriate measure of teaching effectiveness. Referred to as a learner-centered model, one such plan has been in practice at Golden West College (California) since 1967 (Cohen and Brawer, 1969; Shawl, 1972). To summarize the procedure used at Golden West, at the beginning of the semester the individual teacher meets with his division chairman and the academic dean (and perhaps an instructional specialist) to discuss course objectives and techniques for validating student learning. Training in specifying and measuring objectives is also made available for the instructor. The initial meeting results in a "contract" between the instructor and his dean and chairman. Specific, written objectives are shared with students so that they too will know what is to be learned. An important feature of the plan is that a series of "help" sessions are scheduled with the instructor and the dean or chairman to review continuously the objectives and the results of the assessments of student learning. The situation is designed to be not one of threat but of aid, and in a typical session the instructor may be given suggestions about appropriate media or techniques to employ as the course progresses.

The measurement of learning outcomes is also the criterion for attainment employed in Lefforge's (1971) and Case's (1971) proposals for faculty inservice development in community colleges. Lefforge proposes that the instructor specify "performance objectives" for himself and work toward those objectives. Lefforge provides a list of 58 performance objectives (for example, "the ability to name for his area the most fruitful sources of software already on the market") and suggests that a state or regional talent pool be developed to help faculty train toward their objectives.

Corning Community College is an example of a comprehensive system of faculty development now in operation (Chapman, 1972). Beginning teachers are asked to visit the classes of at least four other faculty, two of whom should be outside their own division. In addition to observing classroom practices, the new

teacher discusses the goals for the course and the learning experiences designed for those goals with the instructor. Each new faculty member is then asked to invite someone of his choice to observe his classes at least twice each semester. The new instructor is likewise encouraged to share his goals and strategies with his visitor.

New faculty at Corning are also asked to attend meetings of the faculty governance committees and to become familiar with the functions of at least three administrative offices. Workshops, seminars, instructional counselors and other resources are also part of the development program.

Programs To Prepare College Teachers[1]

Learning how to be an effective teacher has not been an important part of the graduate school experience, in spite of the fact that most doctoral recipients become teachers. A study by Nowlis, Clark, and Rock (1968), concluded that "poor training and supervision [of teaching assistants] constitute a general and serious deficiency in graduate education with concomitant failures in undergraduate education." In view of this, the three authors prescribed ten principles for designing effective programs to prepare the graduate student for teaching. Among the ten suggestions by Nowlis, Clark, and Rock are:

1. The graduate students should have a *progressive sequence* of experience in undergraduate teaching, starting with an apprenticeship and moving on to an assistantship.
2. While most graduate students would be eligible for a one-term apprenticeship, criteria of teaching promise and current competence should be applied to all assistantship appointments.
3. Experience with a variety of teaching methods and teaching resources should be available to the teaching assistant.
4. The teaching apprenticeship and assistantship should provide experiences through which the graduate student may gain greater understanding of the nature and problems of the teaching profession.

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[1] A further discussion as well as a listing of studies and programs dealing with the preparation of college teachers may be found in *Preparing College Teachers*, by Carol Shulman (1970), the second in the ERIC Clearinghouse on Higher Education's compendium series.

5. The performance of a teaching assistant should be evaluated through various procedures, and the information should be used in guiding the assistant and in improving the program.

Heiss's (1970) study of 120 departments at 10 major graduate schools also noted the need to upgrade the preparation of college teachers. She suggested that some departments be reorganized to eliminate the specialization normally found in Ph.D. programs. Like Nowlis, Clark, and Rock, she also suggested a model of teacher preparation that would lead the graduate student through three stages—from methodology to supervision to responsibility—for an entire course.

A training program that has been in progress for the past few years and that includes several of the above suggestions is the University of Michigan's College Teacher Training Program. In 1967 a grant from the Danforth Foundation enabled the Center for Research on Learning and Teaching at the University to establish a training program with five participating departments (memorandum to the Faculty, 1969; Koen and Ericksen, 1967). The program enables graduate students to move from novice to teacher in three overlapping steps: apprenticeship, practice, and supervision. At the apprenticeship stage (Level I), teaching fellows participate in workshops, discussion sessions, and apprentice teaching. The teaching experience involves conducting a discussion session or a laboratory; in three of the departments the trainee and his supervisor hold "feedback conferences" following the trainee's teaching sessions.

After one or two terms of apprentice teaching, the trainee moves on to Level II. At this stage the trainee, as with the typical teaching assistant, has his own course or section but receives some guidance.

The Level III teaching fellow is called an instructor and is carefully selected from the teaching-fellow pool. Each instructor works with two to four Level I trainees. The experience thus far at Michigan indicates that the Level III instructor can provide adequate supervision, which the developers of the program believe to be the most helpful element in the program. Since the instructors selected are committed to teaching, they are willing to devote special time and effort to helping the trainees. The instructors, who are still students in some respects, also pose less of a threat to the trainee than would a faculty member.

The University of Michigan College Teacher Training Program also advocates that teaching assistants define their instructional

objectives and then check these goals against student performance. This so-called learning-centered model, as we have earlier noted, is also being used at some junior and community colleges.

While a formal evaluation has not yet been made, the Michigan program with its progressive sequence of stages to ease teaching assistants into full teaching responsibility would seem to present a good deal of promise. A few other institutions, such as Washington University, St. Louis, have also introduced new Ph.D. programs that provide parallel preparation for college teaching. These programs as well as the proposed Doctor of Arts degree (Bowers, 1965) may ultimately correct a serious deficiency in graduate education.

Suggested Workshop Topics

There have been several references in this chapter to workshops and seminars on teaching in faculty development or graduate study programs. One of the criticisms frequently heard about such sessions is that they often deal only with generalities and offer little concrete help to the individual instructor. A few possible topics that could be offered or, in fact, have been offered and that have the potential of providing the instructor with specific information are discussed below.

Improving the use of questions in teaching. The formal lecture, in which the instructor delivers a carefully structured, usually uninterrupted talk to a class of 25 or 250 (the size makes little difference), seems to be used less and less frequently at American colleges and universities. Instead both informal lectures (in which the instructor encourages discussion) and discussion or seminar sessions have become increasingly popular.

An effective discussion session, most educators would agree, depends to a large extent on the kinds of questions asked by the teacher. High school and primary school teachers, according to the findings of several studies, exhibited many shortcomings in their use of questions in teaching (for a review of this research, see Gall, 1970). First, the research indicates that teachers' questions tend to emphasize facts rather than critical thinking; the "what" instead of "why." Second, many of the questions posed by the teachers were not relevant to the purpose of the lesson. And finally, for a high proportion of the classes studied, there was a low percentage of student participation in the discussions.

While research evidence is lacking at the college level, there is no reason to believe that college teachers would be faultless in this respect. Certainly getting students to think critically is an important goal of most college discussion sessions. Yet teachers receive little training or information on how to ask the right kinds of questions or, equally important, on how to keep the discussion open, yet relevant to course objectives.

A program that has produced significant changes with elementary school teachers was developed recently at the Far West Laboratory for Educational Research and Development (Borg, Kelley, Langer, and Gall, 1970). Referred to as a minicourse, the program is inservice training taking about 15 hours to complete and relying on techniques such as modeling, self-feedback, and microteaching. Microteaching, in particular, seems to be a promising method. It involves the teacher's preparing a short demonstration lesson of from 5 to 25 minutes in length. The lesson is videotaped and then viewed in the presence of an observer or supervisor. The final step involves reteaching the lesson to see to what extent the teacher has improved a particular technique.

Minicourses obviously could be developed for other classroom teaching skills; for example, lecturing and role playing (as in fact the Far West Laboratory has already done for elementary school teachers). These might then be offered as part of faculty development programs or graduate student training.

Improving teacher-made tests. Another topic that would be of benefit to many current or prospective college teachers is how to construct good examinations and how best to use the results. Properly used, tests can play an important role in the instructional process. Most teachers think of tests only as providing a summary evaluation of how much students have learned in the course, but Scriven (1967) has identified a second important function: providing the instructor with periodic feedback on what students know or don't know, thus telling the instructor what needs to be stressed. He calls this the formative function of tests.

Anderson (1972), after reviewing some 130 recent articles, concluded that educational researchers had done a very poor job of test construction. Few had, for example, constructed items according to a "topical content analysis of instructional materials" (p. 167). Similar faults may likely be found in the tests of most classroom teachers, and while it is not necessary for teachers to be experts in test construction, they could undoubtedly improve

their skills in this area. (A number of books and pamphlets are available on this topic; for example, Engelhart, 1964.) Furthermore, there is no need to limit the workshop to testing alone; it could be expanded to include possible alternative ways of monitoring student progress.

Developing course objectives. As discussed earlier in this chapter, there is a current emphasis (particularly among community colleges) on encouraging instructors to specify their objectives for a course; often they are encouraged to state their "performance objectives," or what they expect students will know or be able to do as a result of the course. Regardless of whether these objectives become part of a "contract," as at Golden West College, most faculty members who want to take a closer look at what they are trying to accomplish with their students could profit from some training in defining objectives.

One example of a workshop that included training in how to write performance objectives was the 2-week summer seminar (1972) sponsored by the Association of Independent Colleges and Universities of Michigan (AICUM). Member colleges were given "how to" materials for writing performance objectives and were also aided in designing their own program of instruction. Microteaching experiences and sessions in multimedia presentations were also included.

Improving faculty-student interaction. There have been several studies that have pointed out that teachers who are accessible and generally more "interactive" with students seem to be the most effective (see, for example, Feldman and Newcomb, 1969; Centra and Rock, 1971; Wood and Wilson, 1972). In view of this repeated finding, how might teachers be helped to improve their relationships with students?

Workshop topics might include something about the needs and development of college students generally as well as students at the particular college. Another useful practice is followed by a few institutions who encourage their faculty members to gain a better understanding of themselves and their interaction with others (including students) by offering various kinds of group dynamics sessions, often conducted by a qualified member of the psychology department. Along these lines, during summer 1972 the U.S. Office of Education sponsored an institute at Freed-Hardeman College that included topics such as "Developing Positive Faculty Attitudes Toward Learners."

7 Technological Impact on Teaching Improvement

The more conventional methods of instruction have been considered; yet there are those who argue if there is to be any *noticeable* improvement in teaching and learning, it must come from new approaches. The new approaches advocated are the new technologies, or what Eric Ashby (1967 and 1972a) described as the "fourth revolution." The problems and potential contributions of the new technology to teaching improvement are briefly considered.

Foremost among the new technologies, according to the Carnegie Report, are cable TV, videocassettes, computer-assisted instruction, and learning kits to be used with audiovisual independent study units. These new approaches, the report argues, have several advantages for students:

- They "increase the opportunity for independent study."
- They "provide the student with a greater variety of courses and methods of instruction."
- They "are infinitely tolerant and infinitely patient toward the slow learner." Similarly, they can pay particular attention to the special needs of all students.
- And finally, the new technology can make access to further study easier, both by educating more students at the colleges and by bringing education to the home (p. 2, 3).

Regarding this last point, the new technology, in short, could facilitate mass education. Ashby (*Chronicle of Higher Education*, Oct. 2, 1972) reminds us that mass education is like mass production, in that "hand-made" methods are inconsistent with both; much of mass higher education, he argues, has to be impersonal and must rely on the new technologies.

The medium that probably holds the most promise for instructional improvement is the computer. Unlike other media, the computer or computer-assisted instruction (CAI) can assume a variety of roles, ranging from simply a passive informational resource to a simulated instructor that interacts with the student. It enhances the individualization of instruction by interaction with the student and by being capable of storing enormous quantities of information about the past and present performance of a particular student (Anastasio and Morgan, 1972). The computer can then prescribe readings and other learning experiences based on individual needs.

As far as faculty members are concerned, the Carnegie Commission report states that the new technology "can lessen routine instructional responsibilities in the more elementary work in languages, mathematics, the sciences, accounting, and other fields [p. 3]." By so doing it could also free faculty to concentrate on such higher-order teaching goals as developing student values and attitudes, motivation, and analytical skills. In addition, Ashby (*Chronicle of Higher Education,* 1972) believes there are two kinds of education that will always require a personal student-teacher relationship. The first is vocational education, or at least that part best taught in an apprentice-teacher relationship. The second is the education of that small fraction of students he refers to as "the innovators of intellectual life and the pacesetters in cultural and moral standards." This gifted group, he argues, needs the intellectual challenge and rigor that only a master teacher can provide.

In sum, the new technology appears to promise something for everyone. There would be more help for slow learners and for students learning the elementary skills in many subject areas; there would be more attention given by faculty to the gifted; there would be a greater variety of courses and methods available to a greater number of people; and there would be more opportunity for the faculty to concentrate on critical higher-order goals of education. With all these apparent advantages, why isn't the new technology being implemented more rapidly? Anastasio and

Morgan (1972), after surveying a cross-section of experts in the field, identified three major factors that have inhibited the use of computers in instruction: educational, economic, and technical. Most critical, they say, is the educational dimension—that is, the lack of adequate materials or programs and the absence of evidence of CAI effectiveness. An evaluation of the effectiveness of CAI is getting underway using two systems: the PLATO IV system developed by the University of Illinois and TICCIT (for Time-shared, Interactive, Computer-Controlled Information Television), which is being implemented at two community colleges by the MITRE Corporation.

A second critical problem according to Anastasio and Morgan is economic. The high initial investment by colleges and universities, together with doubts that CAI will reduce the instructional budget, may result in reticence on the part of institutions to invest in computer instruction. The third problem—the technical difficulties involved in creating an adequate CAI delivery system—was judged much more manageable than the previous two.

To the above list of problems, (which probably apply to technologies other than CAI as well) there might be added the fourth deterrent of faculty skepticism. As the Carnegie Commission report states, "many faculty members have been disenchanted by persistent findings in many studies indicating that the learning effectiveness of instruction provided by technology is not significantly different from that of good professors and teachers using conventional modes of instruction" (many of these studies have, for example, compared TV and live lectures). Coupled with this is faculty resentment of the high cost of technology, an expense that in their view might better be used for salaries, and the fear that the new media will replace them or, at the very least, minimize their importance.

In spite of this, the Carnegie Commission estimates by the year 2000, 10 to 20 percent of the on-campus instruction will be performed by technology and will affect 80 percent or more of the off-campus instruction. This means that each student in college may spend an average of one day a week learning via the new technology.

While proponents are hopeful that the new devices can become an integral part of teaching-learning systems, faculty members may at first feel more comfortable to simply adapt their teaching to the new techniques, much as some teachers have with the older technology of films, recordings, and the like. After faculty members have become familiar with the new devices, they

might be willing to explore fresh curricular strategies, such as the "system of individually taught courses" proposed by Jarold Kieffer. A brief description of the plan follows: (see *Efficiency in Liberal Education* by Bowen and Douglas (1971) for a complete description of the Kieffer plan as well as other proposed modes of instruction).

> For a typical course, each student would come at his convenience to a learning station (or library or laboratory if that were the station) and work on the program for phase I of the course at his own pace. At the completion of the phase he would attend, along with other students at the same state of readiness, a seminar with the course instructor. Each seminar would provide informal discussion, opportunities for questions, answers, and additional perspective. After this, if the student judged he was ready, he would take a test. If he passed the test, he would proceed to phase II, etc. If he failed he would return to phase I with no penalty other than delay to repair his deficiencies. A comprehensive examination after successful completion of all phases would be the basis of the course grade, though the results of reports, reading, term papers, etc., could also be counted. The student would be free at any time during the course to consult his instructor privately, but their primary contact would be in seminars and indirectly at learning stations where programmed learning materials would bear the unmistakable mark of each instructor (p. 16).

Summary and Conclusions

This report has considered a number of ways to improve or reform college instruction. The methods discussed vary from those that would attempt to change what the teacher does to those that would change primarily what the student does (although by implication this also changes the teacher's role). Which particular way one chooses to improve instruction undoubtedly depends on one's underlying philosophy of education. At one extreme, there are those who believe, either implicitly or explicitly, that the teacher's role is to help pass on a body of knowledge to students. While students are expected to put forth effort, a good deal of the responsibility for what students learn rests generally with the teacher, and improving teaching often means finding ways to improve such things as the organization of the course and the teacher's classroom performance. At the other extreme, there are those who believe that the responsibility for learning rests with the student, and that the teacher functions as a manager, a facilitator of learning who directs and motivates students when necessary. Improvement in this latter instance means helping the teacher to both develop and implement whatever techniques will cause students to learn more. In sum the strategies for improving teaching presented in this report, like the various roles available for the teacher, cover a wide spectrum.

Strategies Covered in the Report

In Chapter 2 a model for a college course is developed that provides a framework for discussing the components of teaching and learning. In Chapter 3 a brief overview of the research findings

on teaching and learning is presented that relies on previous reviews, where possible. Three general areas from the model presented in Chapter 2 were summarized: research on teacher characteristics, research on instructional practices and learning experience, and research on so-called interaction effects. Teacher characteristics research has not resulted in consistent findings regarding the demographic, personality, or other characteristics of effective teachers. Even if relevant characteristics could be identified, the usefulness of the findings for improving teaching would seem questionable.

A number of studies have used the "consensus" approach to identify effective teaching practices, the results of which are sometimes used to construct instructional rating scales. Other studies have employed anthropological techniques to gain a better understanding of what happens in the college classroom. And finally, there have been numerous studies on teaching methods (e.g., lecture versus discussion) that suggest the particular method used makes little difference in how much students learn. While these findings might be explained by the possibility that different teaching methods work more effectively for different types of students to obtain different instructional objectives, the results of interaction-oriented research have not been consistently positive either.

As discussed in Chapter 4, self-analysis by itself would seem to hold little promise for improving what teachers do. Research evidence clearly indicates that teachers' views of their performance may differ considerably from views held by students, colleagues, and administrators.

Methods to aid the self-analysis process are needed. Bringing in an outside team of experts is one approach, although a limited one. Observations by faculty colleagues appear to be a promising method, as does the use of audio/video feedback, particularly if accompanied by some kind of focus.

In Chapter 5 it was seen that student ratings of instruction do lead to some modest improvement in teaching. This was the conclusion of a five-college study recently completed by the author. In that study only the individual instructors knew the results of their students' ratings, and the interpretation of the ratings as well as what to do about them was entirely in their hands.

There are ways to increase the likelihood that student feedback will lead to instructional improvement, such as providing faculty with detailed information about how to interpret and use

the results. Using the results as a source of information for small group discussions, personal counseling with teachers, or as one of the inputs for decisions on promotions might provide incentive to change, but there are also some possible drawbacks. In any case, in view of the ease with which student ratings can be collected and employed for instructor self-improvement, they appear to have sufficient impact to be used as *one* method of improving college teaching.

In Chapter 6 it was concluded that good faculty development (or inservice) programs are scarce. A few existing programs as well as proposed programs were briefly described. There is, among several 2-year colleges in particular, an emphasis on a learner-centered model that includes specifying and assessing course objectives. While some institutions have established centers or offices to facilitate the improvement of teaching, there needs to be a commitment on the part of more colleges and universities to provide money, facilities, and high administrative support for the development of effective teaching.

Similarly, the graduate schools need to design effective programs to prepare people for college teaching. One such possibility is the internship program at the University of Michigan, which provides a progressive sequence of experiences to ease teaching assistants into full teaching responsibility.

Workshops on teaching frequently play an important role in faculty development or graduate study programs. Specific topics that can be of practical assistance to teachers should, in the author's view, take precedence in such workshops.

As discussed in Chapter 7, the new technology has a good deal of potential as an improvement to teaching-learning, particularly in some subject areas. But there are also some critical obstacles, two of which are the cost of implementation and faculty wariness. Large scale studies are not in progress to investigate the vital questions of cost-effectiveness and the possible contributions of the computer and other devices to the improvement of learning. Whatever the outcomes of these studies, colleges will probably still depend on conventional methods of instruction, and ways to improve these methods, such as those discussed in this report, will still need to be considered.

Whose Responsibility?

The question of whose responsibility it is to carry out the needed improvement of teaching needs to be posed. Is it the individual teacher? The colleges? The graduate schools? Perhaps the foundations should take the lead, since they can fund the development and implementation of new technologies. Undoubtedly a strong case could be made for all groups to act. For colleges the need to improve or reform teaching may be especially critical. In view of the increasing interest in credit-by-examination and other nontraditional forms of higher education, colleges must demonstrate that they do indeed provide students with learning not otherwise available.

Bibliography

The ERIC Clearinghouse on Higher Education abstracts and indexes the current research literature on higher education for publication in the U.S. Office of Education's monthly volume, *Research in Education* (RIE). Readers who wish to order ERIC documents cited in the bibliography should write to the ERIC Document Reproduction Service, Post Office Drawer 0, Bethesda, Maryland 20014. When ordering, please specify the ERIC document (ED) number. Unless otherwise noted, documents are available in both microfiche (MF) and hard/photocopy (HC). All microfiche titles cost $0.65; hard/photocopy reproduction costs $3.29 per 100 pages. All orders must be in writing and payment must accompany orders of less than $10.00.

Anastasio, Ernest J. and Judith S. Morgan. *Factors Inhibiting the Use of Computers in Instruction*. National Science Foundation (NSF GJ 27427), Washington, D.C.: EDUCOM, 1972.

Anderson, Richard C. "How to Construct Achievement Tests to Assess Comprehension." *Review of Education Research* 42, no. 2 (Spring 1973).

Ashby, Eric. "Eric Ashby on Mass Higher Education." *Chronicle of Higher Education,* 2 October 1972, p. 8.

———— . "Machines, Understanding and Learning: Reflections on Technology in Education," *The Graduate Journal* 7 (1967).

Ashby, Eric et al. *The Fourth Revolution: Instructional Technology in Higher Education.* Carnegie Commission on Higher Education, New York: McGraw Hill Book Company, June 1972a.

Astin, Alexander W. and Calvin B. T. Lee. "Current Practices in the Evaluation and Training of College Teachers." In *Improving College Teaching.* Washington, D.C.: American Council on Education, 1967.

Axelrod, Joseph. "Teaching Styles in the Humanities." *Effective College Teaching*, edited by William H. Morris. Washington, D.C.: American Association for Higher Education, 1970.

Berliner, David C. and Leonard S. Cohen. "Trait-treatment Interactions and Learning." Research Bulletin 73-25. Princeton: Educational Testing Service, June 1972.

Borg, W. R., M. L. Kelley, P. Langer and M. Gall. *The Minicourse: A Microteaching Approach to Teacher Education.* Beverly Hills, Calif.: Macmillan Educational Services, 1970.

Boulding, Kenneth B. "The Task of the Teacher in the Social Sciences." In *Effective College Teaching*, edited by William H. Morris. Washington, D.C.: American Association for Higher Education, 1970.

Bowen, Howard R. and Gordon K. Douglass. *Efficiency in Liberal Education: A Study of Comparative Instructional Costs for Different Ways of Organizing Teaching-Learning in a Liberal Arts College.* Carnegie Commission on Higher Education, New York: McGraw-Hill Book Company, 1971.

Bowers, Fredson. "Doctor of Arts: A New Graduate Degree." *College English* 27 no. 2 (1965): 123-128.

Brawer, F. B. *Personality Assessment of College and University Faculty: Implications for the Junior College.* Washington, D.C.: American Association for Junior Colleges, 1968.

Bryan, R. C. *Reactions to Teachers by Students, Parents and Administrators.* (United States Office of Education, Cooperative Research Project No. 668.) Kalamazoo: Western Michigan University, 1963.

Case, Chester H. "A Conceptual Scheme for a Comprehensive Program in Faculty Development: The Tri-Cluster Model." Paper prepared for the Satori Faculty Development Workshop/Conference, Berkeley, University of California, December, 1971.

Centra, J. A. "Problems of Evaluating Teaching." *Current Issues in Higher Education*, Washington, D.C.: Association for Higher Education, 1966.

———————. "Self-Ratings of College Teachers: A Comparison with Student Ratings." RB 72-33, Princeton: Educational Testing Service, 1972c.

———————. *The Student Instructional Report: Its Development and Uses.* SIR Report Number 1. Princeton: Educational Testing Service, 1972a.

———————. *The Utility of Student Ratings for Instructional Improvement.* PR 72-16, Princeton: Educational Testing Service, August 1972b.

———————and D. Rock. College Environments and Student Academic Achievement. *American Educational Research Journal* 8, no. 4 (November 1971).

Chapman, Robert A. "Faculty Development and Evaluation at Corning Community College." Presented at Conference on Faculty Evaluation and Development, New York State Education Department, May 1972.

Choy, Chunghoon. "The Relationship of College Teacher Effectiveness to Conceptual Systems Orientation and Perceptual Orientation." Unpublished Ed.D dissertation, Colorado State College, 1969.

Clark, M. J. and R. T. Blackburn. "Assessment of Faculty Performance: Some Correlates Between Self, Colleagues, Students and Administrators." Center for Study of Higher Education, University of Michigan, 1971 (mimeo).

Cohen, Arthur M. and Florence B. Brawer. *Measuring Faculty Performance.* Washington, D.C.: ERIC Clearinghouse for Junior Colleges, 1969.

Cohen, S. A. and W. G. Berger. "Dimensions of Students' Ratings of College Instructors Underlying Subsequent Achievement on Course Examinations." In *Proceedings of the 78th Annual Convention of the American Psychological Association,* 1970. Washington, D.C.: American Psychological Association, 5 (1971): 605-606.

Costin, Frank, W. T. Greenough, and R. J. Menzes. "Student Ratings of College Teaching: Reliability, Validity, and Usefulness." *Review of Educational Research* 41, no. 5. (December 1971).

Diekhoff, J. S. *Tomorrow's Professors.* New York: Fund for the Advancement of Education, 1960.

Dietrich, J. R. and F. C. Johnson. "A Catalytic Agent for Innovation in Higher Education." *Education Record* (Summer 1967).

Dubin, Robert and Thomas C. Taveggia. *The Teaching Learning Paradox. A Comparative Analysis of College Teaching Methods.* Oregon: University of Oregon Press, November 1970.

Eble, Kenneth. *Career Development of the Effective College Teacher.* Washington, D.C.: American Association of University Professors, November 1971.

_____. *The Recognition and Evaluation of Teaching.* Project to Improve College Teaching, Salt Lake City, Utah, 1971.

Education Daily, May 31, 1972, p. 7.

Engelhart, Max D. "Improving Classroom Testing." AERA-OCT Research Pamphlet Series, December 1964.

Ericksen, Stanford C. (ed.). *Memo to the Faculty no. 37.* Ann Arbor: Center for Research on Learning and Teaching at University of Michigan, October 1969.

Feldman, K. A. and T. M. Newcomb. *The Impact of Colleges Upon Their Students.* San Francisco: Jossey-Bass, 1969.

Gage, N. L., P. J. Runkel, and B. B. Chatterjee. "Changing Teacher Behavior through Feedback from Pupils: An Application of Equilibrium Theory." edited by W. W. Charters and N. L. Gage. In *Readings in the Social Psychology of Education*, Boston: Allyn and Bacon, 1963. Pp. 173-181.

Gall, Meredith. "The Use of Questions in Teaching." *Review of Educational Research* 50, no. 5 (December 1970).

Goldberg, L. R. *Student Personality Characteristics and Optional College Learning Conditions.* University of Oregon: ORI Research Monographs Vol. 9, No. 1, 1969.

Gustad, John W. "Orientation and Faculty Development." *The Educational Record* (July 1963): 195-213.

Heider, F. *The Psychology of Interpersonal Relationships.* New York: Wiley and Sons, 1958.

Heiss, A. M. *Challenges to Graduate Schools.* San Francisco: Jossey-Bass, 1970.

Hodgkinson, H. "How to Evaluate Faculty When You Don't Know Much About Them." Berkeley: University of California, *The Research Reporter.* 7, no. 3 (1972).

Jarrett, J. L. "Teachers and their Evaluation." Proceedings of a Conference on the Evaluating of Teaching, Burlingame, California: California Junior College Association, April 1972.

Johnson, Elizabeth H., J. W. Forestal, Jr., and George H. Layman. "A Plan for the Improvement of Teaching in State System Institutions, 1969-1971. Progress Report I." Prepared for the Oregon State Board of Higher Education, Committee on Academic Affairs, May 21, 1968.

Kolk, Frank and Stanford C. Ericksen. "An Analysis of the Specific Features Which Characterize the More Successful Programs for the Recruitment and Training of College Teachers." Center for Research on Learning and Teaching. University of Michigan, Ann Arbor, June 1967. Project S-482.

Lefforge, Orland S. *In Service Training as an Instrument for Change.* Washington, D.C.: ERIC Clearinghouse on Higher Education, 1971. ED 055 577. MF-0.65, HC-3.29.

Mann, Richard D. et al. *The College Classroom: Conflict, Change, and Learning.* New York: John Wiley and Sons, Inc. 1970.

Mann, W. R. "Changes in the Level of Attitude Sophistication of College Students as a Measure of Teacher Effectiveness." *Dissertation Abstracts,* 1969, *29,* (8-A): 2443-2444.

Many, Wesley et al. *In-service Education in American Senior Colleges and Universities: A Status Report.* Northern Illinois University, DeKalb: College of Education, 1969.

McKeachie, Wilbert J. *Research on College Teaching: A Review, Report 6.* Washington, D.C.: ERIC Clearinghouse on Higher Education, (November 1970).

_____, Y. Lin, and W. Mann. "Student Ratings of Teacher Effectiveness: Validity Studies." *American Educational Research Journal* 8 (1971): 435-445.

_____ and D. Solomon. "Student Ratings of Instructors: A Validity Study." *Journal of Education Research* 51 (1958): 379-382.

Medley, D. M. and H. E. Mitzel. "Measuring Classroom Behavior by Systematic Observation." In N. L. Gage (ed.) *Handbook of Research on Teaching.* Chicago: Rand McNally and Co. (1963): 247-328.

Memo to the Faculty, Center For Research on Learning and Teaching. University of Michigan, No. 37, 1969.

Miller, M. T. "Instructor Attitudes Toward, and their use of, Student Ratings of Teachers." *Journal of Educational Psychology* 62 (1971): 235-239.

Musella, D. and R. Rusch. "Student Opinion of College Teaching." *Improving College and University Teaching.* 16, no. 2 (1968).

Nowlis, V., K. E. Clark, and M. Rock. The *Graduate Student as Teacher.* Washington, D.C.: American Council on Education, 1968.

Parlett, Malcolm. "Undergraduate Teaching Observed." *Nature* 223 (September 1969): 1102-1104.

Perry, R. D. *Criteria of Effective Teaching in an Institution of Higher Education.* Office of Institutional Research, University of Toledo, 1967.

Quick, F. A. and A. D. Wolfe. "The Ideal Professor." *Improving College and University Teaching* 13, no. 3 (1965).

Rezler, Agnes G. and A. S. Anderson. "Focused and Unfocused Feedback and Self-Perception." *The Journal of Educational Research* 65 (October 1971): 61-64.

Sanford, N. "Academic Culture and the Teacher's Development." Lecture given at the National Associate Conference, 1970.

Scriven, M. "The Methodology of Evaluation." AERA *Monograph Series on Curriculum Evaluation*, No. 1, Perspectives of Curriculum Evaluation, 1967.

Shawl, William F. "A Learner-Centered Model." Proceedings of a conference on the evaluation of teaching, Burlingame, California, California Junior College Association, April 1972.

Shulman, Carol. *Preparing College Teachers.* ERIC Clearinghouse on Higher Education, 1970. ED 041 179, MF-$0.65, HC-$3.29.

Siegel, Laurence. "The Contributions and Implications of Recent Research Related to Improving Teaching and Learning." In *Learning and the Professors*, edited by Ohmer Milton and Joseph Shoben, Jr. Athens: Ohio University Press, 1968.

Sockloff, A. L. and V. T. Deabler. *The Construction of the Faculty and Course Evaluation Instrument.* Philadelphia, Pa.: Temple University Testing Bureau, March 1971.

Solomon, D., W. E. Bezdek, and L. Rosenberg. *Teaching Styles and Learning.* Center for the Study of Liberal Education for Adults, Chicago, Illinois, 1963.

Tuckman, B. W. and W. F. Oliver. "Effectiveness of Feedback to Teachers as a Function of Source." *Journal of Educational Psychology* 59, no. 4 (1968): 297-301.

Wilson, Logan. "The Professor and His Roles." *Improving College Teaching,* edited by Calvin B. T. Lee. Washington, D.C.: American Council on Education, 1967.

Wood, L. and R. Wilson. "Teachers with Impact." Berkeley: University of California, *The Research Reporter* 7, no. 2, 1969.

Additional Readings

Allen, D. W. and K. A. Ryan. *Microteaching*. Reading, Mass.: Addison Wesley, 1969.

Bloom, Benjamin S. et al. *Taxonomy of Educational Objectives Handbook I: Cognitive Domain*. New York: Longmans Green, 1956.

Brown, James, and James W. Thornton, Jr. *College teaching*. New York: McGraw-Hill, 1963.

_____. (eds.). *New Media and College Teaching*. Washington, D.C.: National Educational Association, 1968.

Cox, Richard C. and Nancy Jordan Unks. *A Selected and Annotated Bibliography of Studies Concerning the Taxonomy of Educational Objectives: Cognitive Domain*. University of Pittsburgh, 1967.

Glaser, Robert. "Psychology and Instructional Technology." In *Training Research and Education*, edited by R. Glaser. New York: Wiley and Sons, 1965.

_____. "Ten Untenable Assumptions of College Instruction." *Educational Record* 49 (1968).

Krathwohl, David R., Benjamin S. Bloom, and Bertram B. Masia. *Taxonomy of Educational Objectives Handbook II: Affective Domain*. New York: David McKay, 1964.

Lee, Calvin B. T. (ed.) *Improving College Teaching*. American Council on Education: Washington, D.C., 1967.

MacKenzie, Norman, Michael Eraut, and Hywel C. Jones. *Teaching and Learning*. Paris: Unesco and the International Association of Universities, 1970.

McKeachie, Wilbert J. *Teaching Tips: A Guidebook for the Beginning College Teacher*. Ann Arbor, Mich.: Wahr, 1960.

Miller, Richard. *Evaluating Faculty Performance*. San Francisco: Jossey-Bass, 1971.